ation ABPM device using the ESH criteria. *Blood Press Monit* 2010; 15:225–228.
9. Herbert A, Cruickshank JK, Laurent S, Boutouyrie P, Reference Values for Arterial Measurements Collaboration. Establishing reference values for central blood pressure and its amplification in a general healthy population and according to cardiovascular risk factors. *Eur Heart J* 2014; 35:3122–3132.

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DOI:10.1097/HJH.0000000000001522

Electronic monitoring to diagnose and treat drug nonadherence

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Hamdidouche *et al.* [1] elegantly summarized recent findings about drug adherence in hypertension, with the goal of helping clinicians and researchers to address the problem more efficiently. The authors listed strengths and limitations of 'indirect' methods to measure drug adherence, including clinical estimation and patient questionnaires, pill counting, prescription refill, and electronic monitoring. The later method uses an electronic pillbox that records each time the cap is opened. The authors argue that such monitoring can provide a timing of drug intake but that it is unable to certify the ingestion of correct dose, as opening the box does not mean that the pill was ingested [1]. Although this limitation is well known, several advantages and new technological developments of electronic monitoring have been however overlooked.

Electronic monitoring has been advocated as early as 1989 by Cramer *et al.* [2] to quantify reliably ambulatory patient's drug adherence. Initially, this tool consisted of a pill bottle with a microprocessor in the cap that records dates and times of each opening, with one opening corresponding to one presumptive dose drug taken. Other electronic drug reminder devices and web applications recently developed have largely expanded possibilities of electronic monitoring of adherence. Compared to other indirect methods, electronic monitoring provides a dynamic, and real time – day-to-day – measure of patient's drug intake and omissions [2,3]. This is of major importance because adherence is not a fixed feature of patients but a dynamic process: the degree of adherence changes according to treatment regimen, patients' perceptions of the disease and its treatment, or external influences such as traveling or holidays [3].

The key role is that electronic monitoring is unique to take rational treatment decisions [4]. Indeed, if a patient treated for a condition such as hypertension is not controlled, the physician assumes, most often, the inefficiency of the treatment and changes it. If adherence is not optimal, changing medications will not improve blood pressure control. Unless the patient recognizes being not adherent, physicians cannot differentiate treatment failure because of inadequate treatment or nonadherence. Further, electronic monitoring makes it possible not only to diagnose poor adherence but also to treat it. Several studies suggest, indeed, that it helps control chronic conditions such as hypertension [1,4]. For instance, in a pragmatic randomized controlled study conducted in a community of pharmacist and physicians' networks, hypertensive patients allocated to electronic monitoring achieved a better blood pressure control [4].

Nevertheless, we agree that electronic monitoring, using pillboxes or other tools allowing real-time adherence, is not sufficient *per se* to treat nonadherence in patients with chronic conditions. A comprehensive and personalized approach, involving several strategies, is critical to improve drug adherence [1,5]. In our opinion, adherence should be addressed within novel approaches of care of chronic conditions [6]. With the development of collaborative care model including different healthcare professionals (physicians, nurses, pharmacists) [7], the increasing implication of the patient, and the development of ehealth technologies, intervening to diagnose and treat poor adherence is becoming truly possible.

ACKNOWLEDGEMENTS

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Hamdidouche I, Jullien V, Boutouyrie P, Billaud E, Azizi M, Laurent S. Drug adherence in hypertension: from methodological issues to cardiovascular outcomes. *J Hypertens* 2017; 35:1133–1144.
2. Cramer JA, Mattson RH, Prevey ML, Scheyer RD, Ouellette VL. How often is medication taken as prescribed? A novel assessment technique. *JAMA* 1989; 261:3273–3277.
3. Vrijens B, Vincze G, Kristanto P, Urquhart J, Burnier M. Adherence to prescribed antihypertensive drug treatments: longitudinal study of electronically compiled dosing histories. *BMJ* 2008; 336:1114–1117.
4. Santschi V, Rodondi N, Bugnon O, Burnier M. Impact of electronic monitoring of drug adherence on blood pressure control in primary care: a cluster 12-month randomised controlled study. *Eur J Intern Med* 2008; 19:427–434.
5. Zullig LL, Peterson ED, Bosworth HB. Ingredients of successful interventions to improve medication adherence. *JAMA* 2013; 310: 2611–2612.
6. Community Preventive Services Task Force. Team-based care to improve blood pressure control: recommendation of the community preventive services task force. *Am J Prev Med* 2014; 47:100–102.

7. Santschi V, Wuerzner G, Chiolero A, Burnand B, Schaller P, Cloutier L, *et al.* Team-based care for improving hypertension management among outpatients (TBC-HTA): study protocol for a pragmatic randomized controlled trial. *BMC Cardiovasc Disord* 2017; 17:39.

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DOI:10.1097/HJH.0000000000001524

Who is an expert?

Eoin O'Brien

I would like to question the critical comments by Messerli *et al.* [1] entitled 'Expertise: no longer a sine qua non for guideline authors?', in which they question the credibility of the authors of the recently published 'Clinical Practice Guideline from the American College of Physicians and the American Academy of Family Physicians' pertaining to 'Pharmacologic Treatment of Hypertension in Adults Aged 60 Years or Older' (ACP/AAFP) [2]. The issue raised is simply this: Do the authors qualify as experts? To demonstrate that they did not fulfill the commonly held criteria by which experts may be defined, Messerli *et al.* selected as their gold standard the experts who authored the 'Evidence-based guideline for the management of high blood pressure in adults: report from the panel members appointed to the Eighth Joint National Committee (JNC 8)' [3].

On the face of it, the data presented in the table make a damning case against the authors of the ACP/AAFP guideline (Table 1). Indeed, the authors extol the virtues of the JNC 8 experts in glowing terms: 'When one scrutinizes the authors of what is called the Joint National Committee (JNC) 8 [3], there is little doubt that most of them were indeed true experts, displaying skills or knowledge acquired through education, training, or experience to guide other physicians in detection, evaluation, and treatment of patients with hypertension. Many of these authors have extensively published on hypertensive cardiovascular disease, are members of professional societies and editorial boards of peer reviewed journals on hypertension' [1]. Whew, all but the most skeptical would be swept away by the gale of this rhetoric! However, what Messerli *et al.* failed to acknowledge was the sheer inability of the JNC 8 'experts' to produce a credible guideline as I have outlined in detail previously [4]. Indeed, this failure to see the elephant in the room is baffling in view of the fact that in withdrawing from authorship of the editorial, I warned against using the JNC 8 guideline as the comparator: 'I think it best if you remove my name, simply because, I have written a critical essay on JNC 8 showing that even if you have a panel of so-called 'experts', they can make just as much a mess of things as 'nonexperts'. In fact, I have questioned the credibility of the JNC 8 Committee of experts, which will be picked up by someone if I am a listed author, and a counter attack would weaken your justifiable case. Had you selected any other guideline for comparison I would have been glad to join your protest' [Personal communication from E. O'Brien (present author) to Messerli *et al.*, 10 February 2017].

Just by way of reminding ourselves of the incompetence of the JNC 8 'experts', who oversaw what I have called the JNC 8 debacle, I will list the salient ones: First, a disclaimer at the end of the JNC 8 report, points out that although the National Heart, Lung, and Blood Institute (NHLBI) appointed a panel in 2008 to write JNC 8, it informed the panel in 2013 that it would partner in the future with other organizations to develop hypertension guidelines, effectively dismissing them as experts; second, the guideline did not complete the process laid down by the NHLBI and it was disingenuous of the authors of the report (and indeed of JAMA) to permit the inclusion of the term JNC 8 in the title to the report, thereby implying that it was the long-awaited successor to JNC 7; finally, and most damningly, five of the 17 authors of the JNC 8 article published a disclaimer to one of the recommendations in the report, namely, their disagreement with the all-important stipulation to raise the target SBP from 140 to 150 mmHg in persons aged 60 years

TABLE 1. Comparison of publications, Society of Hypertension certification and membership, and editorial board membership (as per 01/2017)

	No. of publications on hypertension[a]	Society certified specialist[b]	Society membership[c]	Editorial board membership[d]
JNC 8 no. of authors = 17	39 (5.5–121)	8	12	17
ACP/AAFP no. of authors = 6	0.5 (0–2.5)	0	0	0
Associated members ACP/AAFP no. = 28	0 (0–0.75)	0	0	0
2013 ESC/ESH no. of authors = 25	98 (40.5–197)	17	18	23

[a]Median (interquartile range).
[b]http://www.ash-us.org/Physician-Directory.aspx and http://www.eshonline.org/communities/hypertension-specialist/directory-of-specialists/, respectively.
[c]American Society of Hypertension (ASH) and European Society of Hypertension (ESH), respectively.
[d]*Hypertension, Journal of Hypertension, American Journal of Hypertension, Journal of the American Society of Hypertension, Journal of Human Hypertension, and Journal of Clinical Hypertension.*